

**CONTAINS:
NOVEMBER
AND AUTUMN
1991 GLOBAL
CLIMATE
ANOMALIES**

WEEKLY CLIMATE BULLETIN

No. 91/51

Washington, DC

December 21, 1991

TOTAL PRECIPITATION (INCHES)

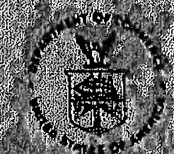
December 15 - 22, 1991



After a tranquil start to the week, a deep, slow-moving storm system crept eastward from the desert Southwest, tapping Gulf moisture and inundating portions of central Texas with as much as 16.2 inches of rain during a five-day deluge. According to press reports, the resultant widespread flooding closed several Interstate highways, drowned hundreds of cattle and other livestock, and forced the evacuation of over 200 individuals as the Trinity River flooded portions of southeastern Dallas. Farther south, the Guadalupe River approached record high levels in conjunction with the heaviest rains (over 8 inches), which fell from San Antonio northward to west of Austin. By Sunday evening, eighteen lives had been lost and half a dozen individuals were still missing as the storm finally weakened and moved off to the northeast.



UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER



CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every three months).
- Global three-month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF DECEMBER 21, 1991

1. Western United States:

DRIER THAN NORMAL CONDITIONS PERSIST.

Light precipitation (3-12 mm) was observed in southern California while 10-40 mm were measured across the northern third of the state. Meanwhile, little or no precipitation fell along most of the western coastline and through the San Joaquin Valley. Since early November, the northern and west-central portions of California have accumulated deficits of 70-155 mm [7 weeks].

2. Southern Plains, Lower Mississippi Valley, and Tennessee Valley:

SOUTHERN PLAINS INUNDATED WHILE EASTERN SECTIONS DRY OUT.

Central Texas from San Antonio northward to Austin were deluged by 300-410 mm of rain, with daily amounts reaching 175 mm (see front cover). Elsewhere, 125-255 mm soaked the remainder of interior Texas while 50-125 mm were recorded at scattered locations across the southern Rockies, western Texas, eastern Texas, and the western Lower Mississippi Valley. In sharp contrast, less than 15 mm fell from the eastern Lower Mississippi Valley eastward. Despite the dry week, however, six-week moisture surpluses remained as high as 185 mm in parts of Alabama and Tennessee [9 weeks].

3. South Atlantic Coast:

LITTLE OR NO PRECIPITATION AGAIN MEASURED.

Another dry week afflicted the south Atlantic coastline. Many locations from north-central Florida northward to the central Carolinas have received only 12-30 mm since November 10, representing only 13-30% of normal [12 weeks].

4. East-Central South America:

SURPLUS RAINFALL REPORTED.

Since late November, most locations have recorded 120-285 mm of rain. More than three times the normal amount has fallen on

portions of northern and eastern Uruguay (see page 6) [4 weeks].

5. Southeastern Europe, Northeastern Africa, and Western Middle East:

CHILLY CONDITIONS CONTINUE TO GRIP REGION.

Most locations from Switzerland southward and eastward through Italy, northeastern Africa, the Balkans, and the western Middle East recorded weekly departures of -2°C to -6°C, with much of central Turkey 6°C to 9°C below normal. Daily temperatures averaged as much as 14°C below normal in Turkey while wind chills dipped as low as -43°C in Yugoslavia. Heavy snow and icy roadways accompanied the cold weather late in the week, stranding thousands of tourists in the Alps and causing at least five traffic accident fatalities in Germany, according to press reports [5 weeks].

6. East-Central China:

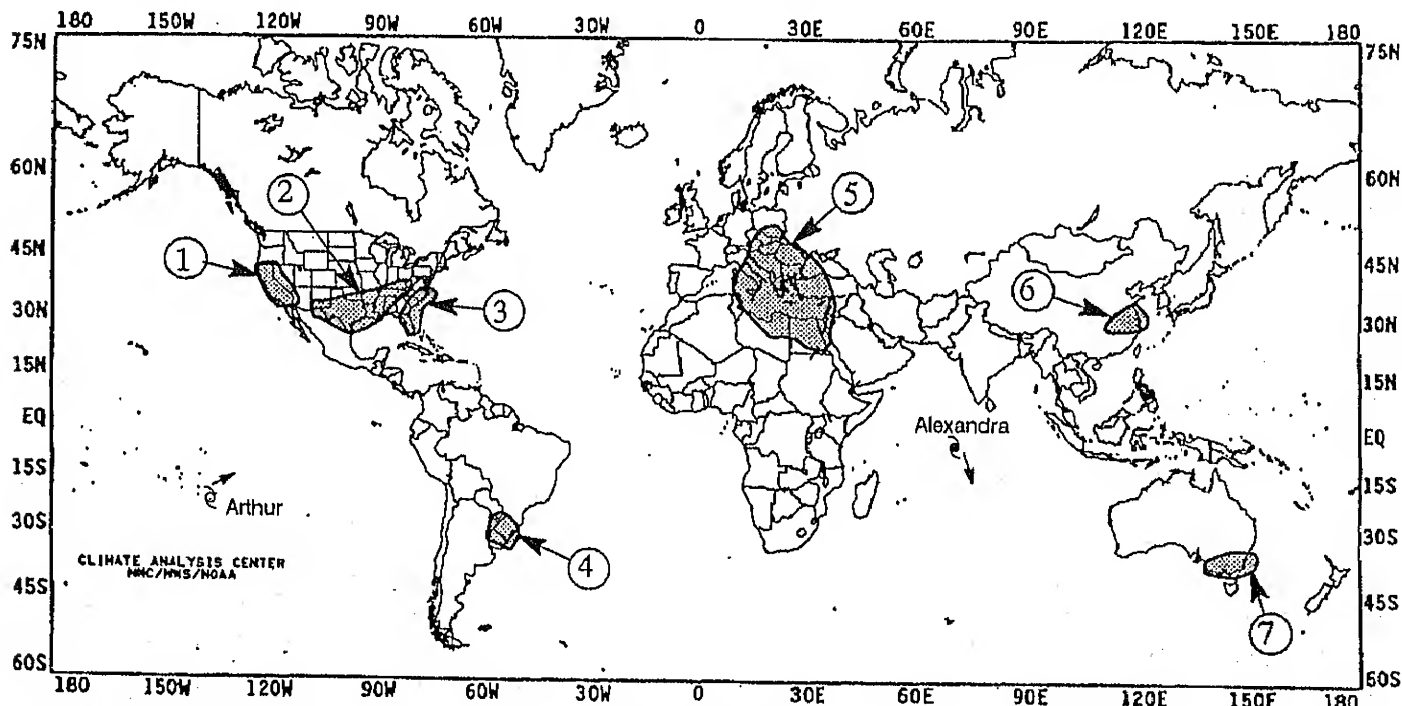
ABNORMALLY DRY CONDITIONS CONTINUE.

Although precipitation totals are relatively light in late Fall, portions of the Yangtze River Valley and east-central China have recorded 50-75 mm below normal precipitation since mid-November. A few typically drier locations west of the central Yellow Sea coast have measured less than 5 mm of rain during this period while parts of the eastern Yangtze River Valley have not reported significant weekly totals (>10 mm) since late September [13 weeks].

7. Southeastern Australia:

MODERATE RAINS ACROSS VICTORIA FINALLY END DRY SPELL.

Moderate rains (30-90 mm) dampened much of Victoria, bringing an end to large short-term moisture shortages across the eastern third of Australia; however, sizable longer-term deficits remain, with most locations having measured below normal normal rainfall since the beginning of the wet season [Ended after 20 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF DECEMBER 15 – 21, 1991

The last full week of Fall featured torrential rains in Texas, abnormally warm weather in the nation's mid-section, and unseasonably cold conditions in the East. Over a foot of rain inundated parts of Texas, flooding numerous roads and homes and contributing to the loss of over a dozen lives, according to press reports. Weekly rainfall totals exceeding 6 inches were reported from San Antonio to Dallas, TX. San Antonio experienced a fourth consecutive day with record daily rainfall on Saturday. In addition, the city has recorded its wettest December on record. To the north, heavy rains forced the Trinity River out of its banks, flooding more than 50 homes and forcing the evacuation of approximately 200 people, according to press reports. Elsewhere, unusually mild conditions prevailed across the middle of the country. Readings topped 60°F as far north as South Dakota, establishing record daily highs in the northern Plains and upper Midwest on Saturday. Meanwhile, wintry weather settled across much of the East as a blast of Arctic air sunk southward out of Canada. Over 2 feet of snow and strong wind gusts produced blizzard-like conditions across the Great Lakes and Northeast while sub-freezing lows dipped as far south as north-central Florida. Farther west, snow and ice forced the closure of I-5 in California for several hours on Thursday, and wind chills dropped to -89°F at Barrow, AK on Saturday.

The week began with wintry conditions in the Great Lakes and New England as an Arctic air mass covered the region. More than 30 inches of snow blanketed Boonville, NY on Sunday while strong wind gusts produced bitter wind chills across lower Michigan. To the west, warm down-slope winds along the eastern slopes of the Rockies pushed temperatures into the fifties and sixties ahead of a storm system tracking across south-central Canada. The low continued to track along the U.S.-Canadian border, intensifying as it moved eastward, while the associated cold front dropped into the nation's mid-section, pushing cooler air into the northern Plains and upper Midwest. By Wednesday, the low had pushed off the Northeast coast, spreading up to a foot of additional snow to parts of the Great Lakes and New England. Behind the system, a blast of Canadian air settled over the Midwest. Highs in the single digits were common across Minnesota and western Wisconsin on Wednesday. Farther west, an area of low pressure developed over the Southwest, spreading rain across southern California and Arizona, with snow in the mountains. Meanwhile, a cold front pushed into the Pacific Northwest, bringing snow to the Cascades.

During the last half of the week, the Arctic air in the Northeast pushed southeastward, producing record daily lows from the mid-Atlantic to New York as readings plunged into

the teens and single-digits. The massive area of high pressure, associated with the Arctic air, produced numerous December record high barometric pressure readings across portions of the mid-Atlantic and Southeast. Elsewhere, the storm system in the Southwest slowly pushed eastward, dumping copious amounts of rain in the southern Plains and heavy snow in the southern Rockies. Over 16 inches of rain was reported north of San Antonio, TX and several locations in Texas reported record daily and record December rainfall amounts (see front cover). Meanwhile, the cold front in the Pacific Northwest trekked across the middle of the country, depositing a wintry mixture of precipitation on the northern and central Plains Thursday and into the Midwest toward the weekend.

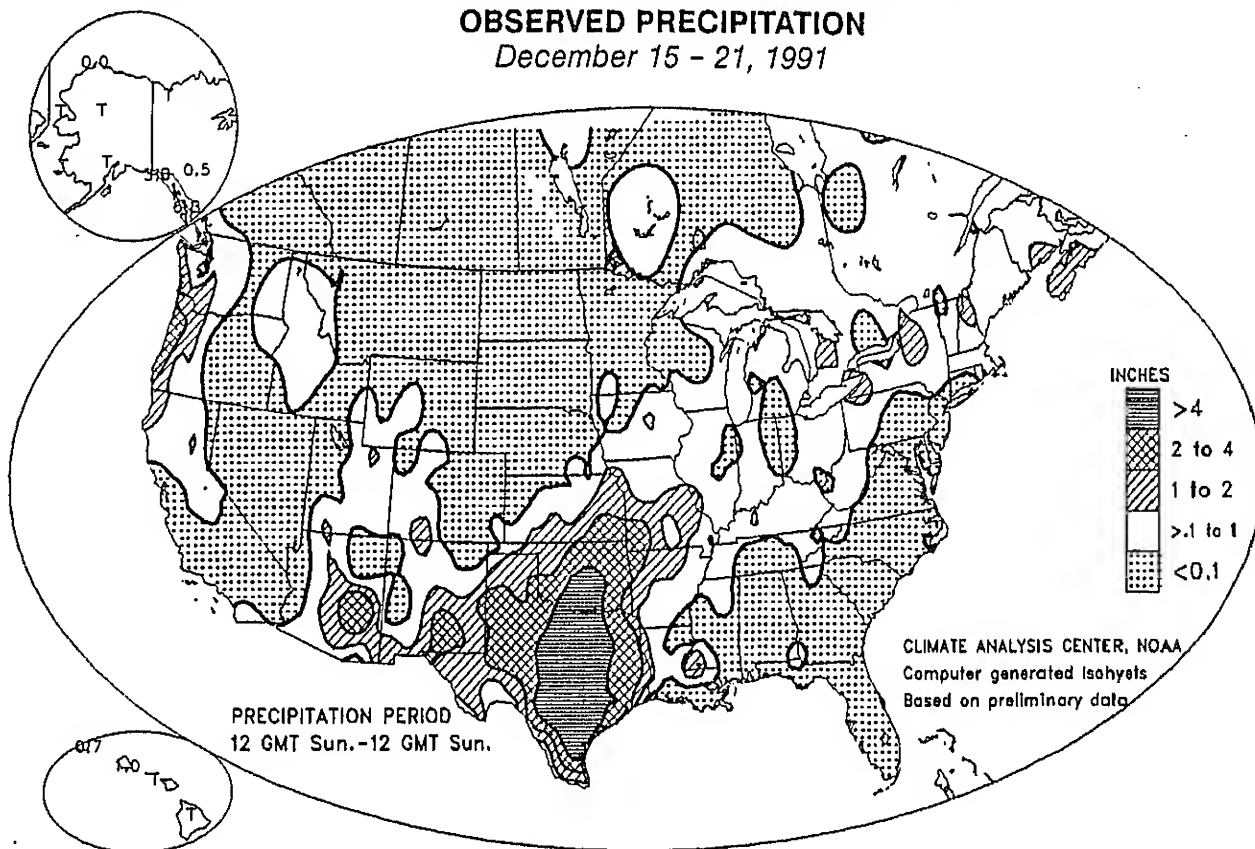
According to the River Forecast Centers, the greatest weekly precipitation totals (more than 2 inches) fell on the southern Plains and scattered locations in the Southwest, Pacific Northwest, and southeastern Alaska (Table 1). Light to moderate amounts were measured across the northern two-thirds of New England, the Ohio Valley, Great Lakes, most of the Mississippi Valley, central Great Plains, southern and central Rockies, northern California, the western halves of Washington and Oregon, the southern third of Alaska, and Hawaii. Little or no precipitation fell from southern New England southward to the central Gulf Coast, across the upper Midwest, northern Plains and Rockies, Great Basin, and in the remainders of the Far West and Alaska.

Abnormally warm weather prevailed across most of the nation's mid-section and the Southwest (Table 2). Weekly departures between +8°F and +12°F were prevalent in the northern Plains while departures of +3°F to +7°F were common from the lower Mississippi Valley northwestward through the central Plains and westward to the desert Southwest. Near to slightly above normal readings covered scattered locations in the eastern Great Plains and the Rio Grande Valley. In Alaska, unusually mild conditions were confined to the southeastern quarter of the state, where weekly departures of +4°F to +8°F were common.

In sharp contrast, unseasonably cold conditions dominated the eastern third of the country and the Pacific Northwest (Table 3). The greatest weekly departures of -8°F to -12°F were recorded in northern Florida, the mid-Atlantic, most of the Ohio Valley, and scattered locations in the central Rockies and Pacific Northwest. Near to slightly below normal temperatures covered the middle Mississippi and Tennessee Valleys, the southern High Plains, and the remainder of the Pacific Northwest. Subnormal temperatures also prevailed across the remainder of Alaska, with weekly departures down to -7°F observed at a few locations.

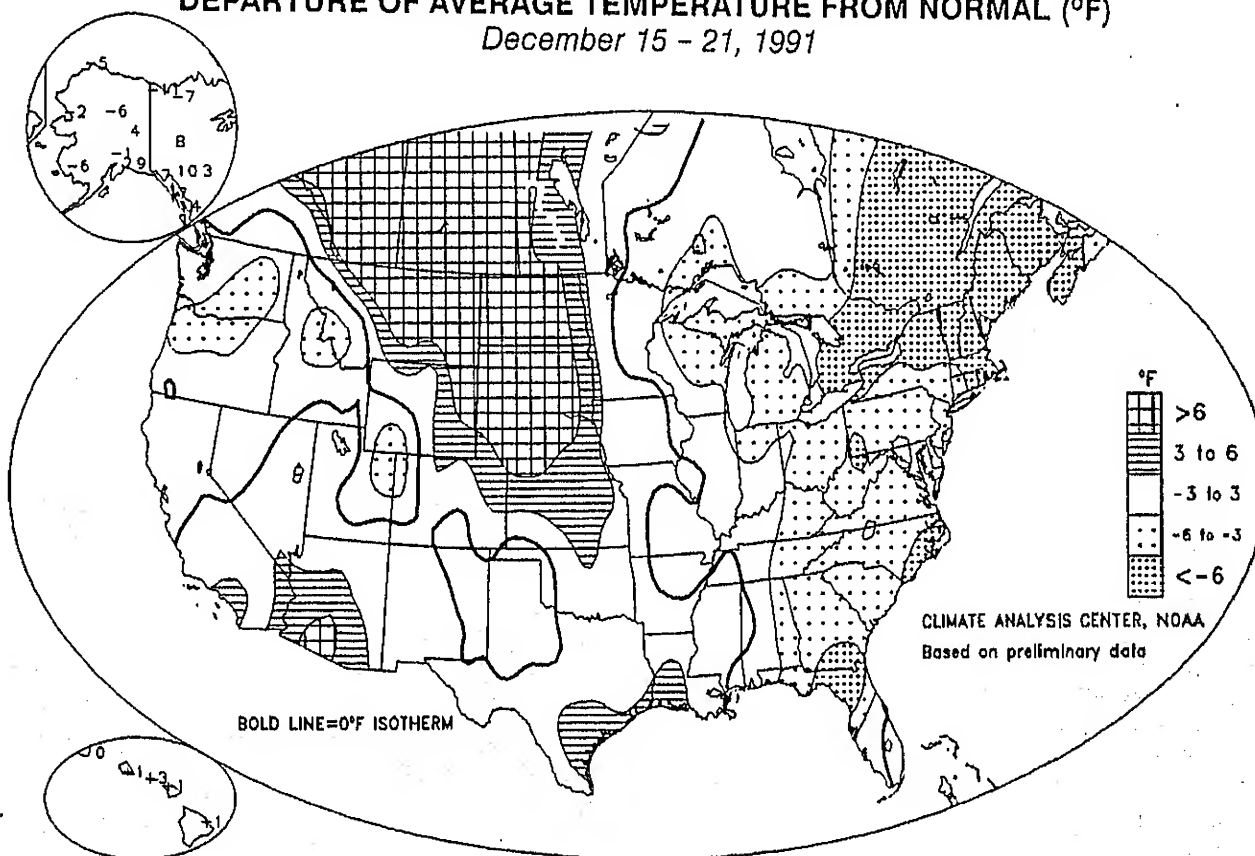
OBSERVED PRECIPITATION

December 15 - 21, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

December 15 - 21, 1991



**TABLE 1. SELECTED STATIONS WITH 3.75 OR MORE INCHES OF PRECIPITATION
DURING THE WEEK OF DECEMBER 15 – 21, 1991**

<u>STATION</u>	<u>TOTAL</u> (INCHES)	<u>STATION</u>	<u>TOTAL</u> (INCHES)
SAN ANTONIO/RANDOLPH AFB, TX	11.40	FT WORTH/MEACHAM, TX	5.72
SAN ANTONIO, TX	10.68	KINGSVILLE NAS, TX	5.71
SAN ANTONIO/KELLY AFB, TX	9.84	DALLAS/LOVE FIELD, TX	5.65
AUSTIN, TX	9.73	DALLAS NAS, TX	5.26
AUSTIN/BERGSTROM AFB, TX	8.63	ABILENE/DYESS AFB, TX	4.91
CORPUS CHRISTI, TX	7.51	KILLEEN/ROBERT-GRAY AAF, TX	4.77
WACO, TX	6.67	COLLEGE STATION, TX	4.53
STEPHENVILLE, TX	6.53	VICTORIA, TX	4.49
ANNETTE ISLAND, AK	6.34	WICHITA FALLS, TX	4.31
FT WORTH/CARSWELL AFB, TX	6.11	HOUSTON, TX	4.22
DALLAS-FT WORTH, TX	6.01	YAKUTAT, AK	3.76

**TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 6.0°F OR MORE
ABOVE NORMAL FOR THE WEEK OF DECEMBER 15 – 21, 1991**

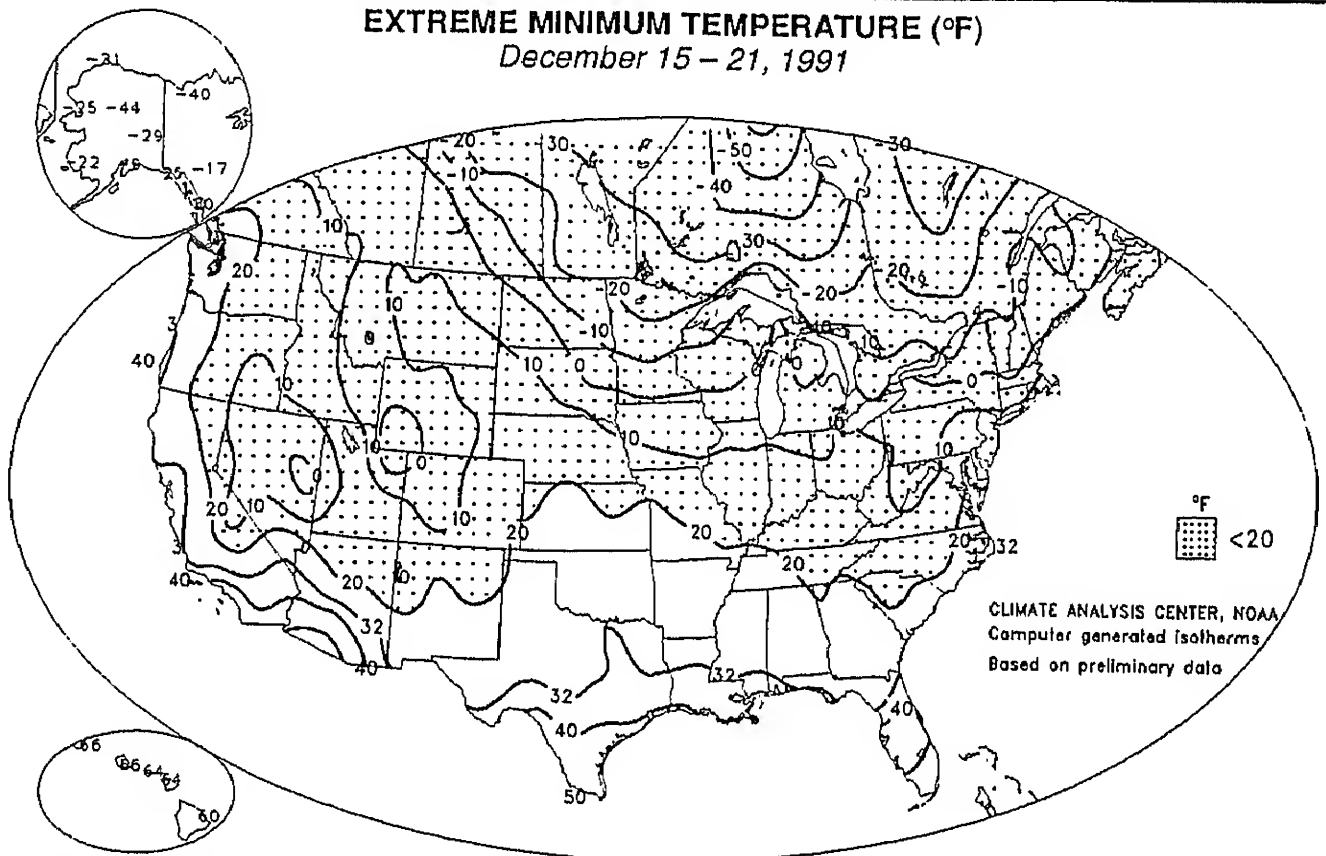
<u>STATION</u>	<u>DEPARTURE</u> (°F)	<u>AVERAGE</u> (°F)	<u>STATION</u>	<u>DEPARTURE</u> (°F)	<u>AVERAGE</u> (°F)
MILES CITY, MT	+11.6	32.5	GULKANA, AK	+7.9	1.1
GLASGOW, MT	+11.1	27.0	BILLINGS, MT	+7.7	34.7
WILLISTON, ND	+11.0	25.7	JUNEAU, AK	+7.5	34.1
BISMARCK, ND	+10.9	25.6	JAMESTOWN, ND	+7.4	20.1
DICKINSON, ND	+10.7	28.7	ABERDEEN, SD	+7.3	22.6
MINOT, ND	+10.4	24.2	SITKA, AK	+7.1	39.4
PIERRE, SD	+9.9	30.9	YAKUTAT, AK	+7.1	33.7
CUT BANK, MT	+9.5	30.1	VALENTINE, NE	+7.1	30.9
RAPID CITY, SD	+9.3	35.0	NORTH PLATTE, NE	+6.9	32.3
LEWISTOWN, MT	+8.9	32.6	DEVIL'S LAKE, ND	+6.6	16.7
VALDEZ, AK	+8.9	27.7	BEEVILLE/CHASE FIELD NAS, TX	+6.3	61.9
HAVRE, MT	+8.3	27.2	HURON, SD	+6.3	24.6
GREAT FALLS, MT	+8.2	33.9	PHOENIX, AZ	+6.2	58.9
NORTHWAY, AK	+8.1	-10.1	GILLETTE, WY	+6.1	30.9
PICKSTOWN, SD	+8.0	31.8	AKRON, CO	+6.0	34.2

**TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 6.0°F OR MORE
BELOW NORMAL FOR THE WEEK OF DECEMBER 15 – 21, 1991**

<u>STATION</u>	<u>DEPARTURE</u> (°F)	<u>AVERAGE</u> (°F)	<u>STATION</u>	<u>DEPARTURE</u> (°F)	<u>AVERAGE</u> (°F)
CROSS CITY, FL	-12.4	49.4	BUFFALO, NY	-6.6	21.9
	-11.6	6.1	JACKSONVILLE, FL	-6.6	48.6
	-9.3	5.5	BETHEL, AK	-6.5	-2.4
	-9.2	6.9	ATLANTIC CITY, NJ	-6.4	29.4
I, NH	-9.1	-0.6	AUGUSTA, ME	-6.3	16.8
	-8.3	18.5	CONCORD, NH	-6.3	17.4
	-8.0	15.3	SUMTER/SHAW AFB, SC	-6.3	41.1
	-7.9	49.6	WILMINGTON, NC	-6.3	41.4
<	-7.4	4.0	BETTLES, AK	-6.2	-15.1
WV	-7.4	26.1	ALPENA, MI	-6.1	17.3
	-7.3	19.1	ROME/GRIFFISS AFB, NY	-6.1	18.8
	-7.1	14.9	YAKIMA, WA	-6.1	25.1
	-7.0	11.9	TRENTON, NJ	-6.1	29.1
	-7.0	36.3	ELKINS, WV	-6.0	25.8
	-6.8	12.9	NEW BERN, NC	-6.0	40.0
	-6.6	-2.9			

EXTREME MINIMUM TEMPERATURE (°F)

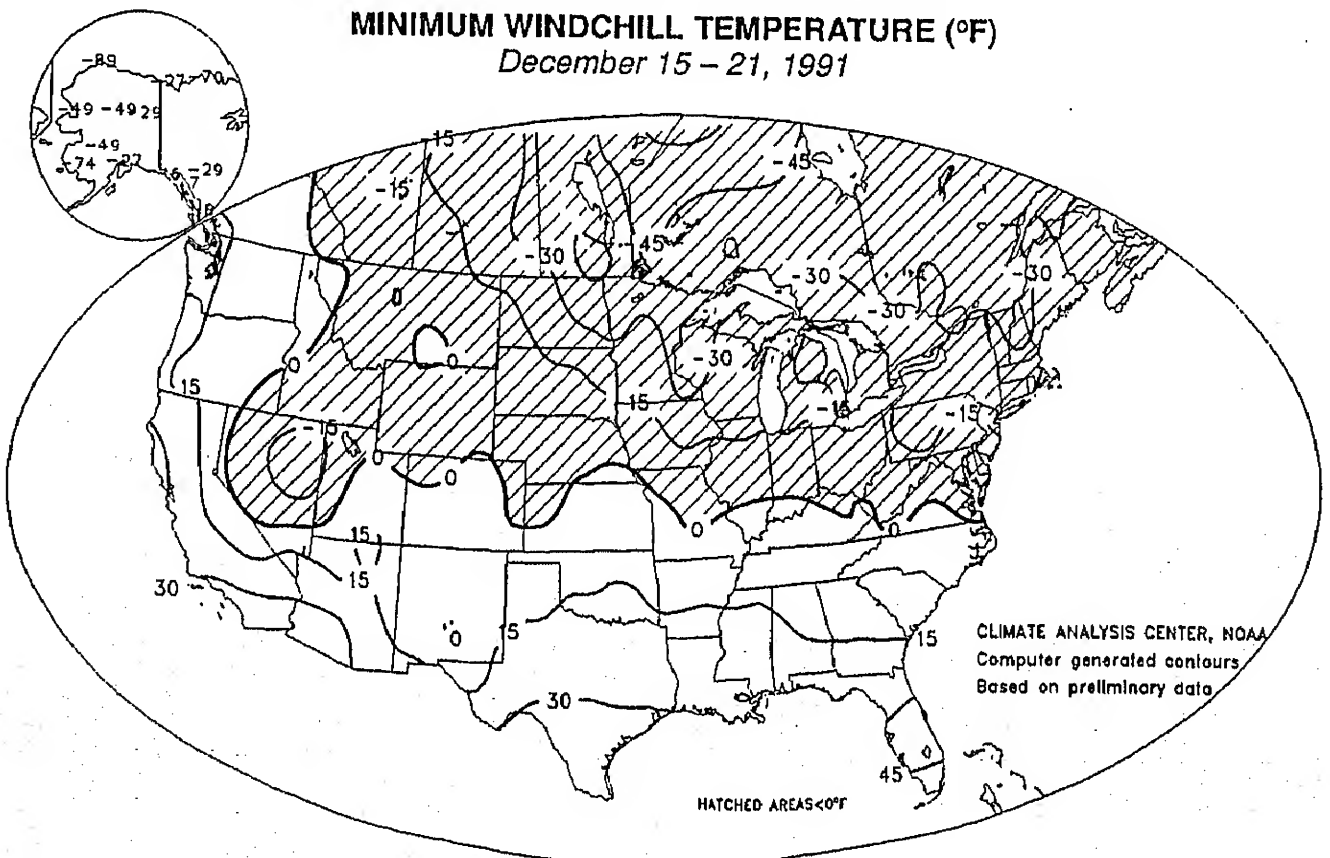
December 15 – 21, 1991



Rather cold conditions affected most of the nation at some point during the week, with sub-freezing readings reaching the east-central Gulf Coast (top). A late-week blast of Arctic air combined with strong wind gusts to produce dangerous wind chills ($<-15^{\circ}\text{F}$) in the upper Midwest, Great Lakes, Northeast, and Great Basin (bottom).

MINIMUM WINDCHILL TEMPERATURE (°F)

December 15 – 21, 1991



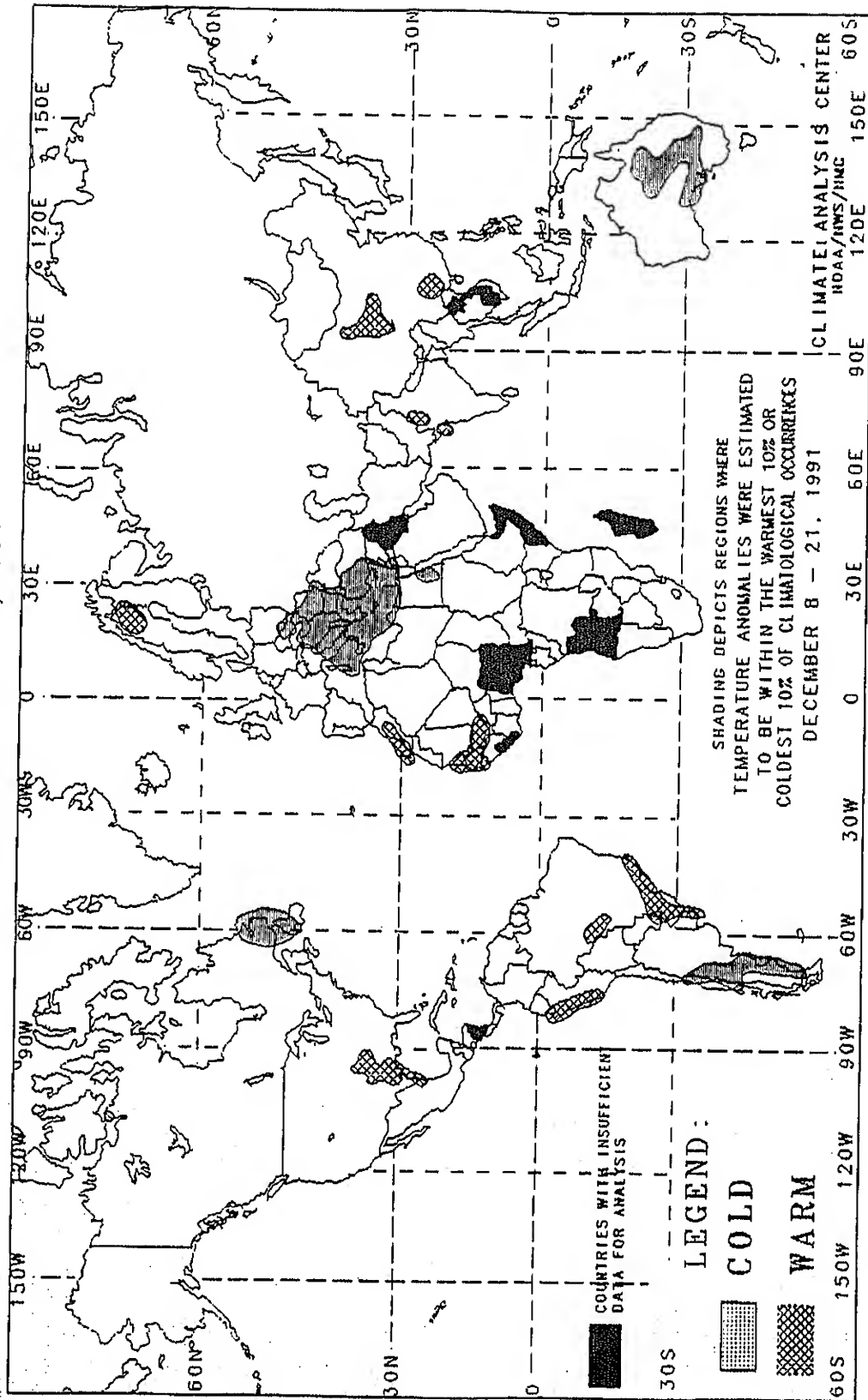
PLOTTED VALUES: TOTAL PRECIPITATION (MM)
CONTOURS: PERCENT OF NORMAL PRECIPITATION

Map of South America showing isopleths of precipitation. The map includes Argentina, Paraguay, Brazil, Uruguay, and the South Atlantic Ocean. Isopleths are drawn for 100%, 150%, 200%, and 300% precipitation. Numerical values are provided along the isopleths and within the regions. A note at the bottom states: "Isopleths drawn only for 100%, 150%, 200%, and 300%".

6

2-WEEK GLOBAL TEMPERATURE ANOMALIES

DECEMBER 8 - 21, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

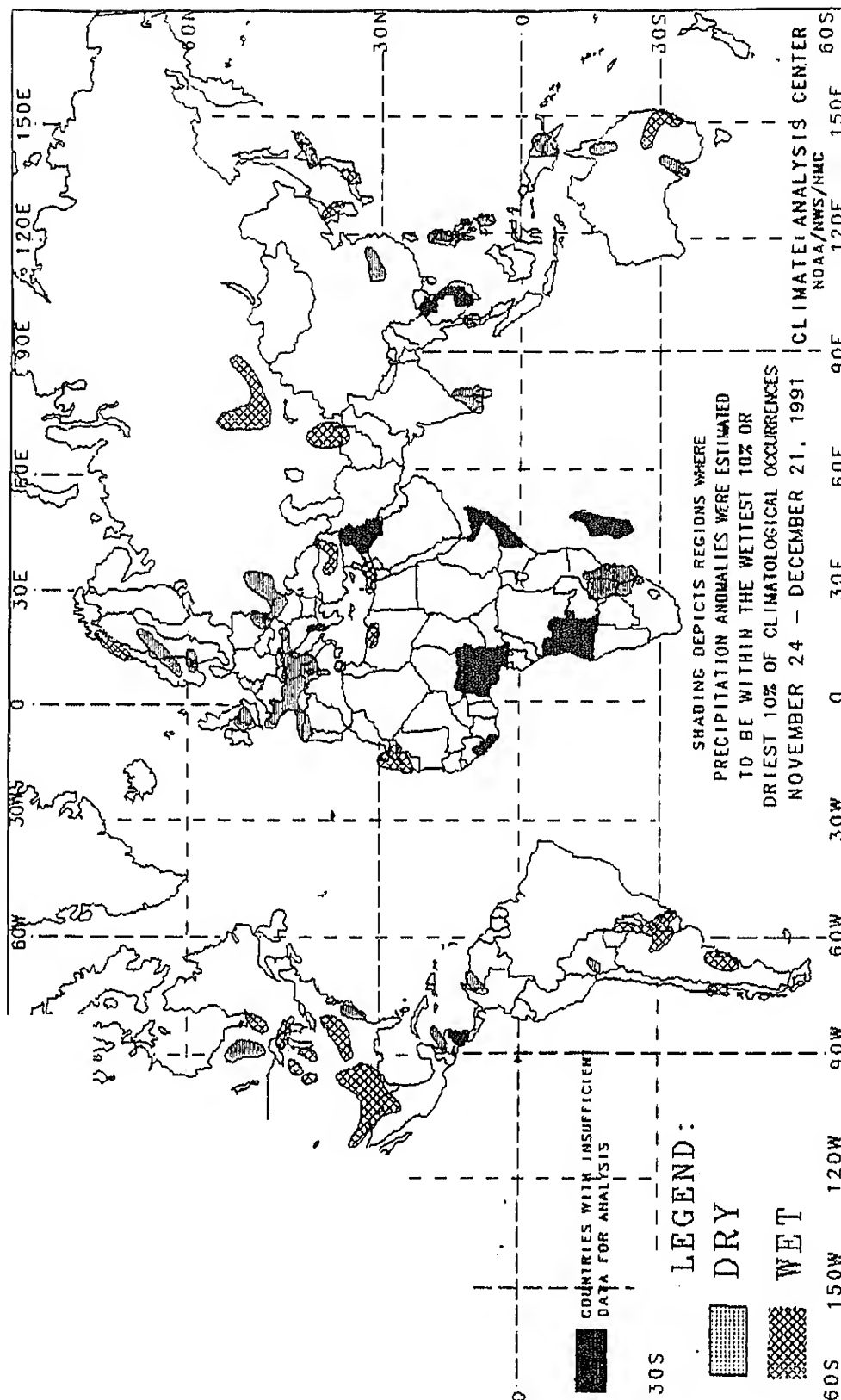
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

< GLOBAL PRECIPITATION ANOMALIES

NOVEMBER 24 - DECEMBER 21, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

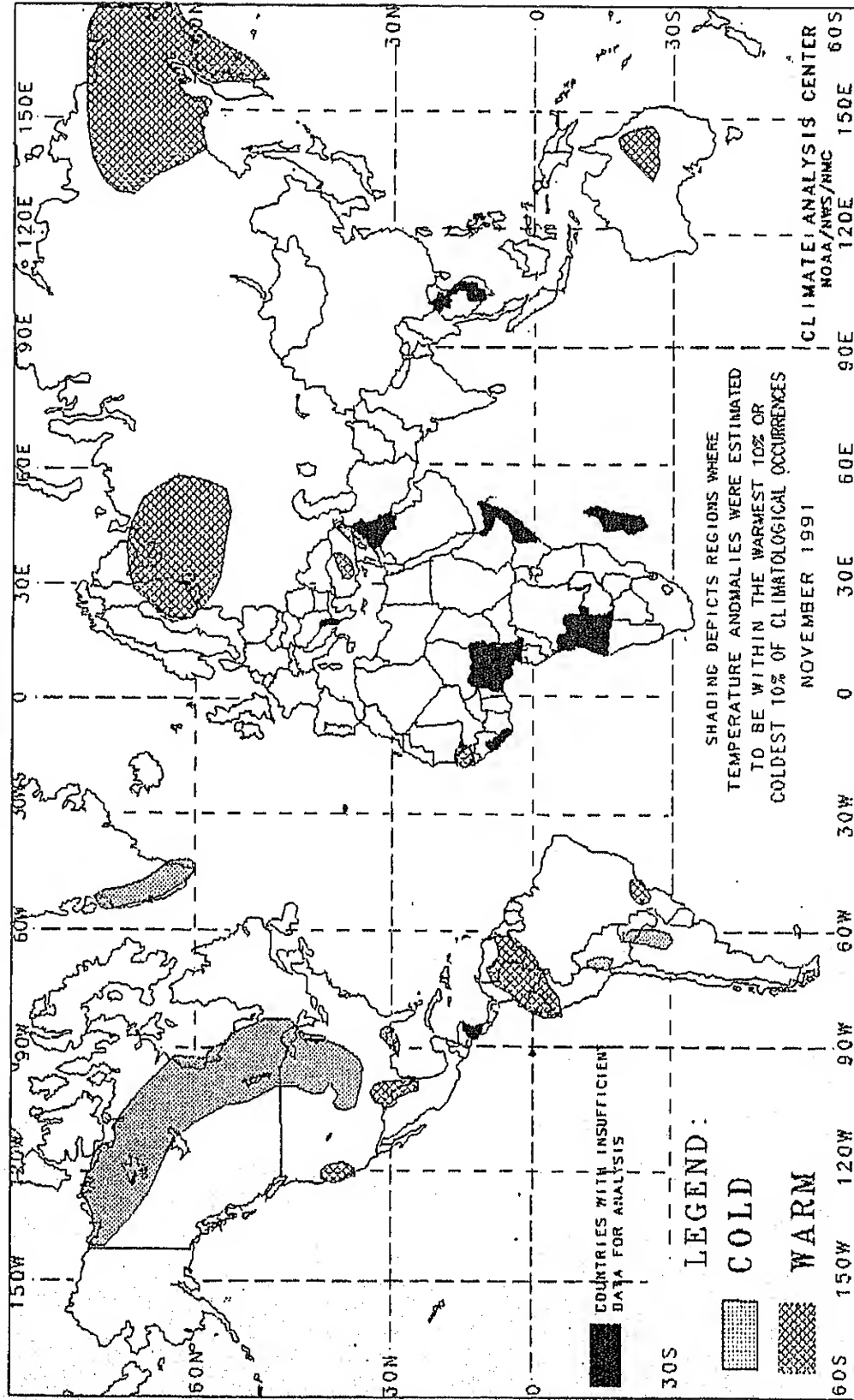
In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

MONTHLY GLOBAL TEMPERATURE ANOMALIES

NOVEMBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 26 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

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This chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

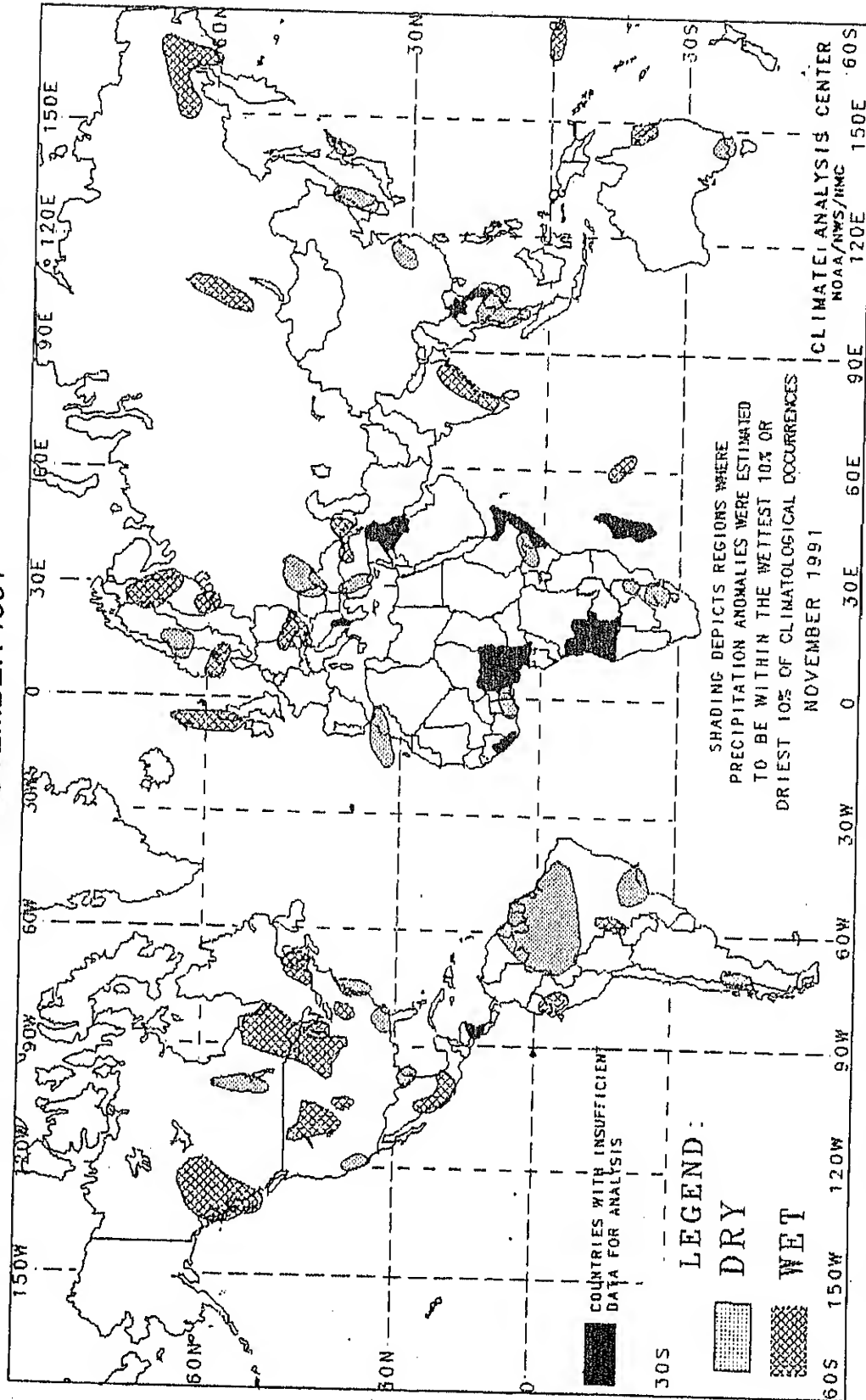
PRINCIPAL TEMPERATURE ANOMALIES

NOVEMBER 1991

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
Canada and North-Central United States	-23 to +4	-2 to -5	COLD - 2 to 10 weeks
Northern California, Western Nevada, and Southern Oregon	+6 to +14	Around +2	Very warm first half of November
Texas and Adjacent Mexico	+9 to +16	-3 to -4	Very cold first half of November
Central Gulf Coast	+12 to +13	-2 to -3	Very cold first half of November
SOUTH AMERICA AND EASTERN PACIFIC			
Cool Islands	Around +26	Around +2	Very warm second half of November
Northwestern South America	+15 to +28	+2 to +3	WARM - 2 to 5 weeks
West-Central Bolivia	+6 to +26	Around -2	Very warm first half of November
Western Paraguay and North-Central Argentina	+21 to +25	-2 to -3	Very cold first half of November
Southeastern Brazil	+20 to +22	Around +2	Very warm second half of November
EUROPE AND THE MIDDLE EAST			
Greenland	-8 to -6	-3 to -5	COLD - 2 to 7 weeks
Finland and Russia	-2 to +4	+3 to +4	MILD - 2 to 14 weeks
South-Central Turkey	+7 to +8	Around +3	Very warm second half of November
Eastern Turkey and Eastern Syria	+9 to +16	Around +2	WARM - 2 to 10 weeks
AFRICA			
Senegal and Gambia	+27 to +29	Around +2	Very warm first half of November
ASIA			
Eastern Siberia	-32 to +2	+2 to +7	MILD - 4 to 14 weeks
AUSTRALIA AND WESTERN PACIFIC			
Australia	+28 to +31	+2 to +3	WARM - 2 to 9 weeks

MONTHLY GLOBAL PRECIPITATION ANOMALIES

NOVEMBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

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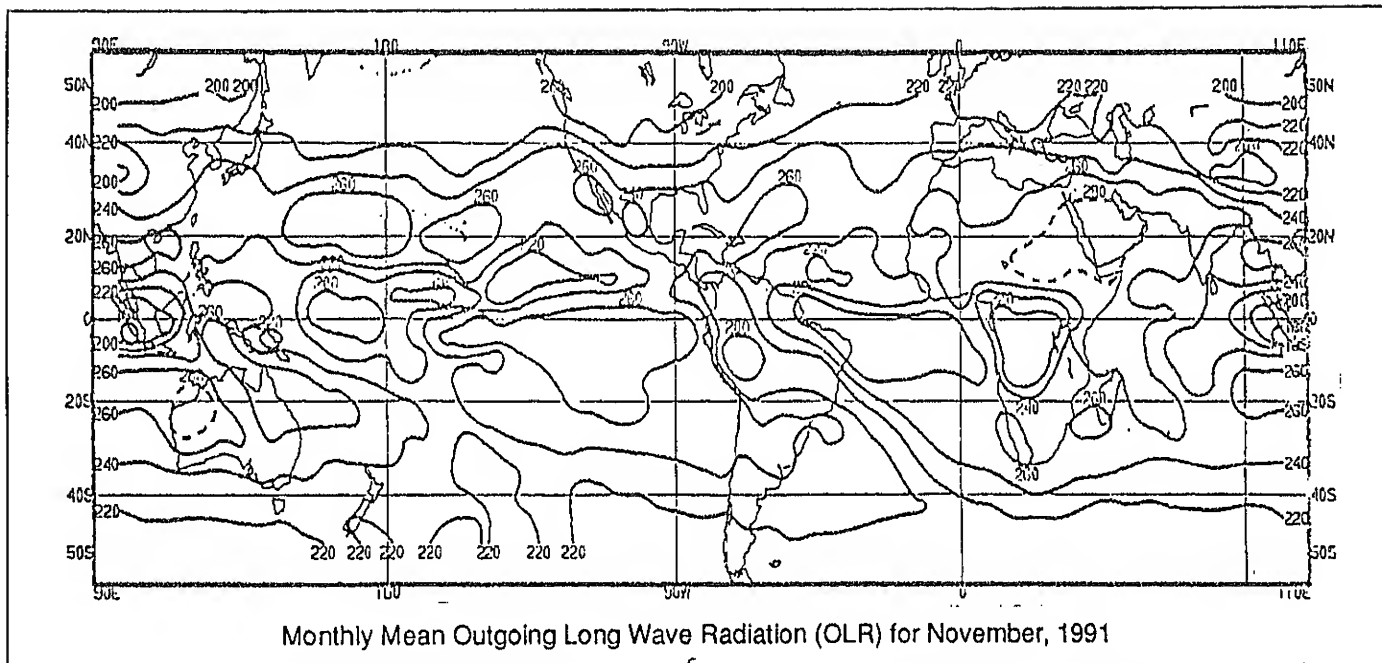
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PRINCIPAL PRECIPITATION ANOMALIES

NOVEMBER 1991

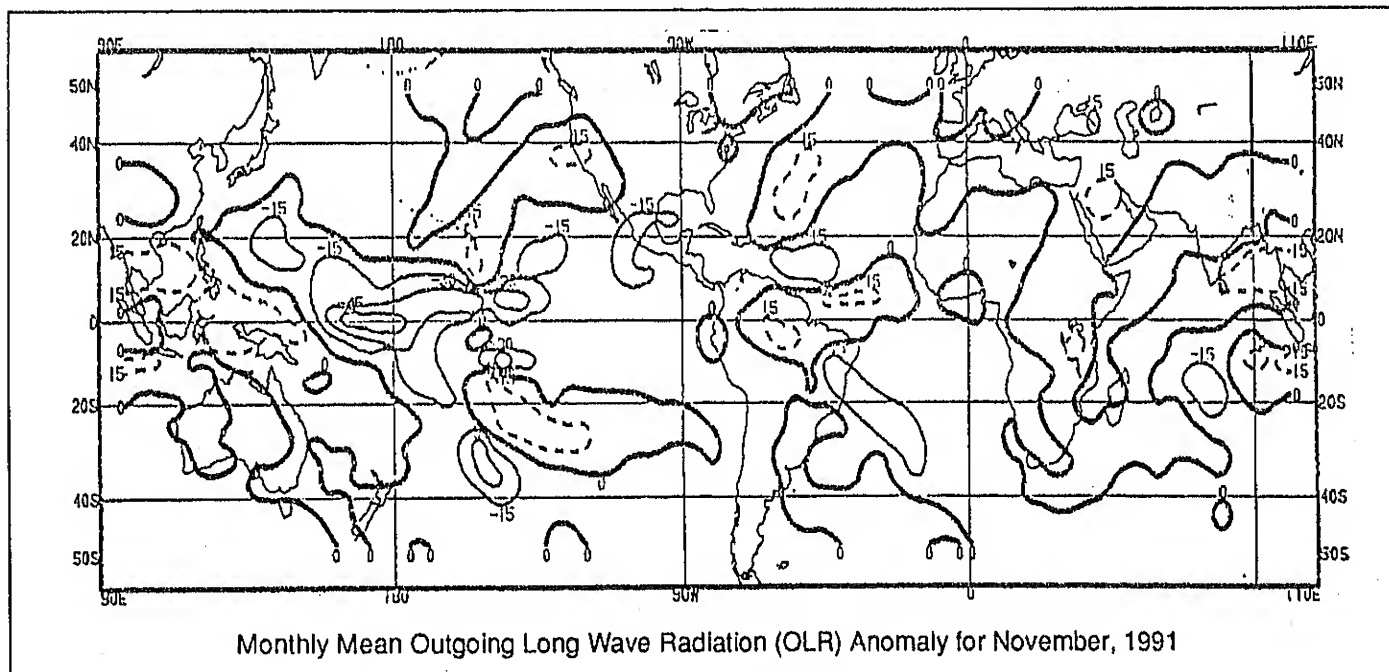
REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
West-Central Canada and Southeastern Alaska	43 to 592	149 to 246	WET - 4 to 8 weeks
South-Central Canada	9 to 10	31 to 35	DRY - 5 weeks
North-Central United States and Western Ontario	58 to 162	160 to 417	WET - 4 to 8 weeks
Northern Rocky Mountain States	42 to 61	180 to 295	WET - 4 to 7 weeks
Central Colorado	52 to 68	335 to 521	Heavy precipitation second half of November
Central California	1 to 4	3 to 11	DRY - 5 weeks
Southern Texas	4 to 24	11 to 31	DRY - 8 weeks
Southeastern United States	16 to 26	22 to 45	DRY - 10 weeks
Ohio and West Virginia	107 to 127	173 to 174	Heavy precipitation second half of November
Middle Atlantic Coast	17 to 29	20 to 24	DRY - 6 to 10 weeks
New England and Southeastern Canada	32 to 41	33 to 52	DRY - 4 to 7 weeks
Western Mexico	73 to 86	243 to 357	Heavy precipitation first half of November
SOUTH AMERICA AND EASTERN PACIFIC			
Northern Venezuela	212 to 237	277 to 462	Heavy precipitation second half of November
Ecuador and Northwestern Peru	103 to 176	167 to 225	WET - 4 weeks
Northern South America	6 to 46	4 to 21	DRY - 5 to 9 weeks
Southwestern Brazil	205 to 258	160 to 174	Heavy precipitation first half of November
Southeastern Brazil	48 to 56	33 to 51	DRY - 4 to 8 weeks
West-Central Argentina	Near Zero	Near Zero	DRY - 6 weeks
EUROPE AND THE MIDDLE EAST			
British Isles	200 to 248	156 to 167	WET - 4 weeks
Southern Norway and Northern Denmark	143 to 202	154 to 185	Heavy precipitation first half of November
Central Sweden	19 to 23	46 to 50	DRY - 4 weeks
Northern Finland	57 to 114	147 to 193	WET - 4 weeks
Southern Finland	111 to 128	165 to 225	WET - 4 to 5 weeks
Austria and Czechoslovakia	52 to 157	184 to 227	WET - 2 to 5 weeks
Romania and the Ukraine	2 to 8	4 to 20	DRY - 5 to 8 weeks
Western Turkey	11 to 17	10 to 26	DRY - 4 to 8 weeks
Eastern Turkey and Adjacent Georgia	59 to 87	191 to 238	WET - 4 to 9 weeks
AFRICA			
Madeira and Morocco	1 to 12	1 to 18	DRY - 4 to 14 weeks
Gulf of Guinea Coast	0 to 12	0 to 12	DRY - 8 to 12 weeks
Northern Kenya	0 to 29	0 to 35	DRY - 6 to 14 weeks
Southeastern Zimbabwe	25 to 36	36 to 48	DRY - 14 weeks
Northeastern South Africa	9 to 65	18 to 47	DRY - 6 weeks
Indian Ocean Islands	74 to 124	237 to 258	WET - 8 to 12 weeks
ASIA			
Central Siberia	45 to 94	177 to 478	WET - 2 to 14 weeks
Eastern Siberia	55 to 91	177 to 190	Heavy precipitation second half of November
Southeastern Siberia and Northeastern North Korea	4 to 5	5 to 15	DRY - 5 to 7 weeks
Hokkaido Island, Japan	25 to 37	Around 40	DRY - 6 weeks
East-Central China	2 to 3	4 to 6	DRY - 18 weeks
Indochina Peninsula	0 to 104	0 to 32	DRY - 6 to 9 weeks
Southeastern India	87 to 181	282 to 525	WET - 2 to 6 weeks
AUSTRALIA AND WESTERN PACIFIC			
Kiribati Islands	309 to 492	371 to 450	WET - 5 weeks
Northeastern Australia	100 to 226	267 to 320	WET - 2 to 10 weeks
Southeastern Australia	3 to 22	9 to 43	DRY - 22 weeks



EXPLANATION

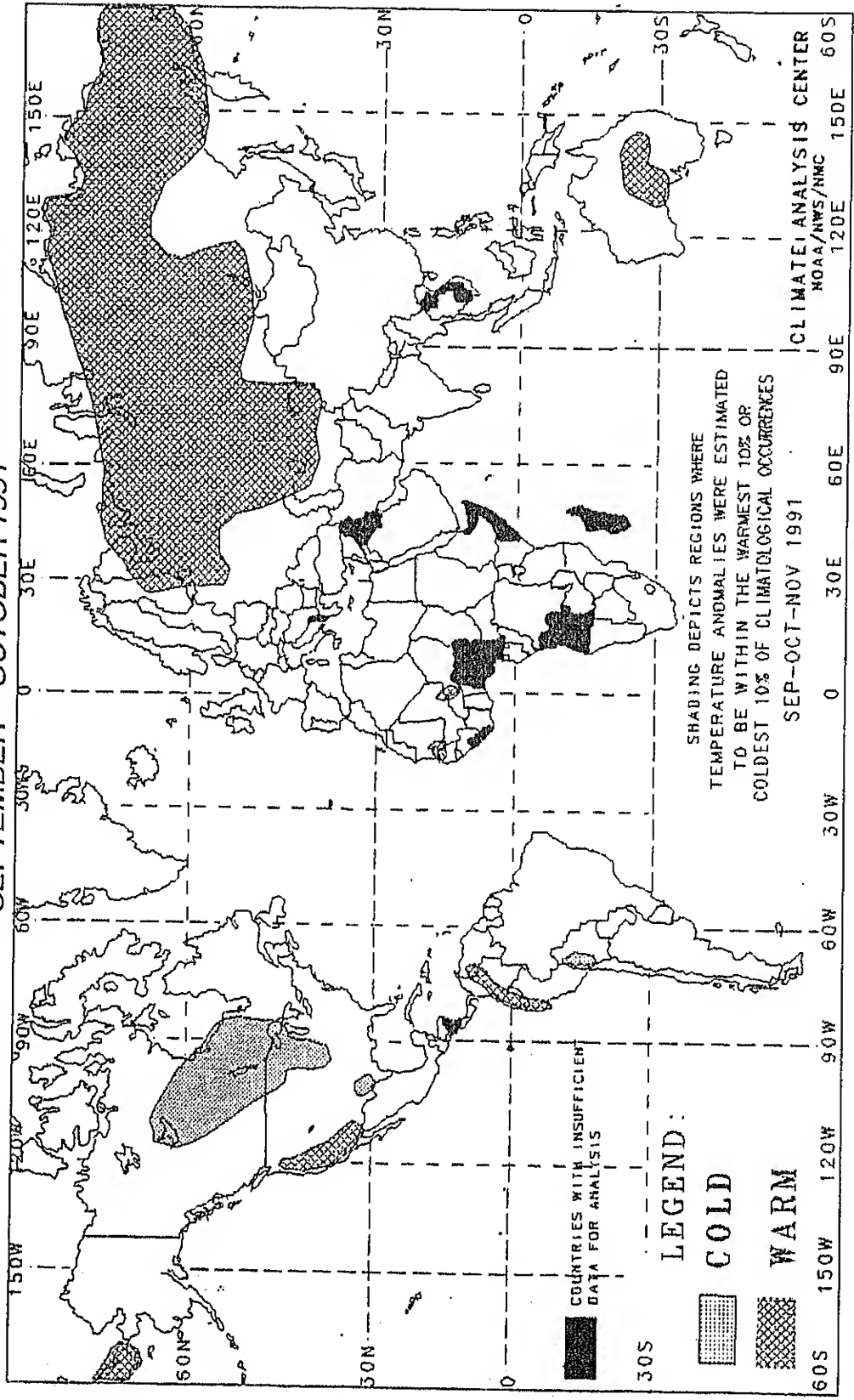
The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2} , and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes $20^\circ\text{N} - 20^\circ\text{S}$) that receive primarily convective rainfall, a mean OLR value of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 - 1988 base period mean. Contour intervals are 15 Wm^{-2} , while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.



3-MONTH GLOBAL TEMPERATURE ANOMALIES

SEPTEMBER - OCTOBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 78 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

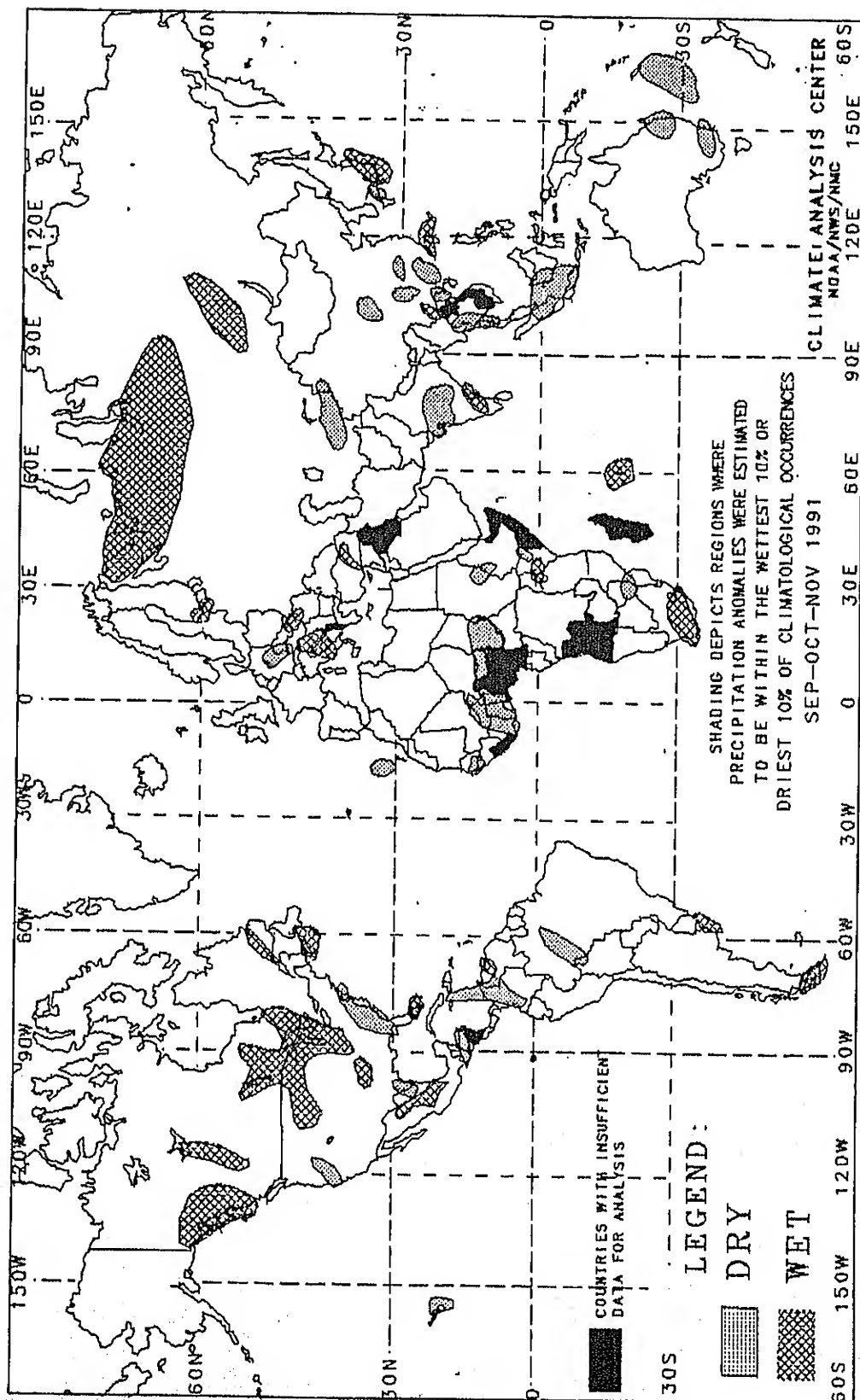
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

3-MONTH GLOBAL PRECIPITATION ANOMALIES

SEPTEMBER - NOVEMBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

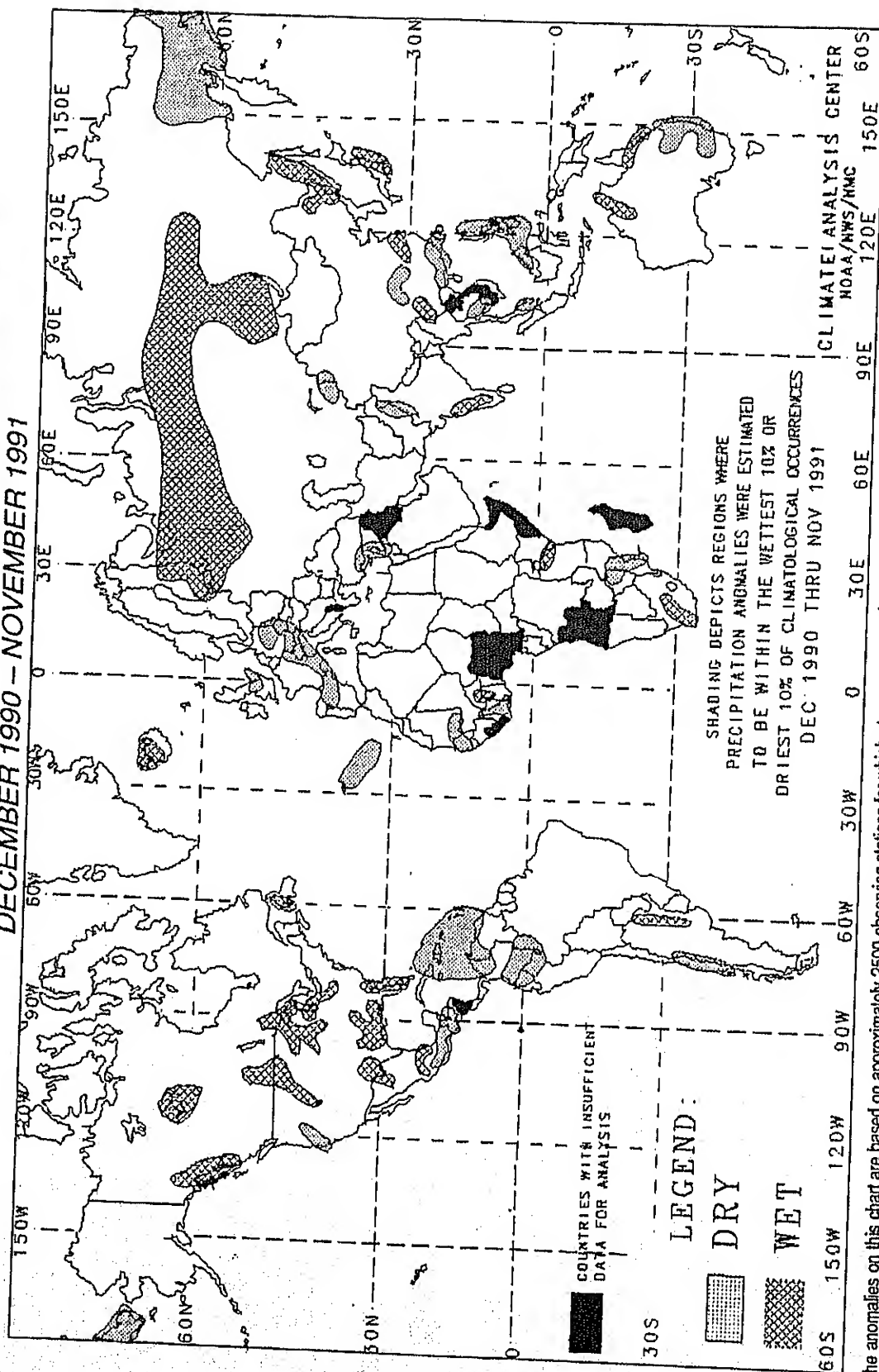
In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total three month precipitation exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

12-MONTH GLOBAL PRECIPITATION ANOMALIES

DECEMBER 1990 - NOVEMBER 1991

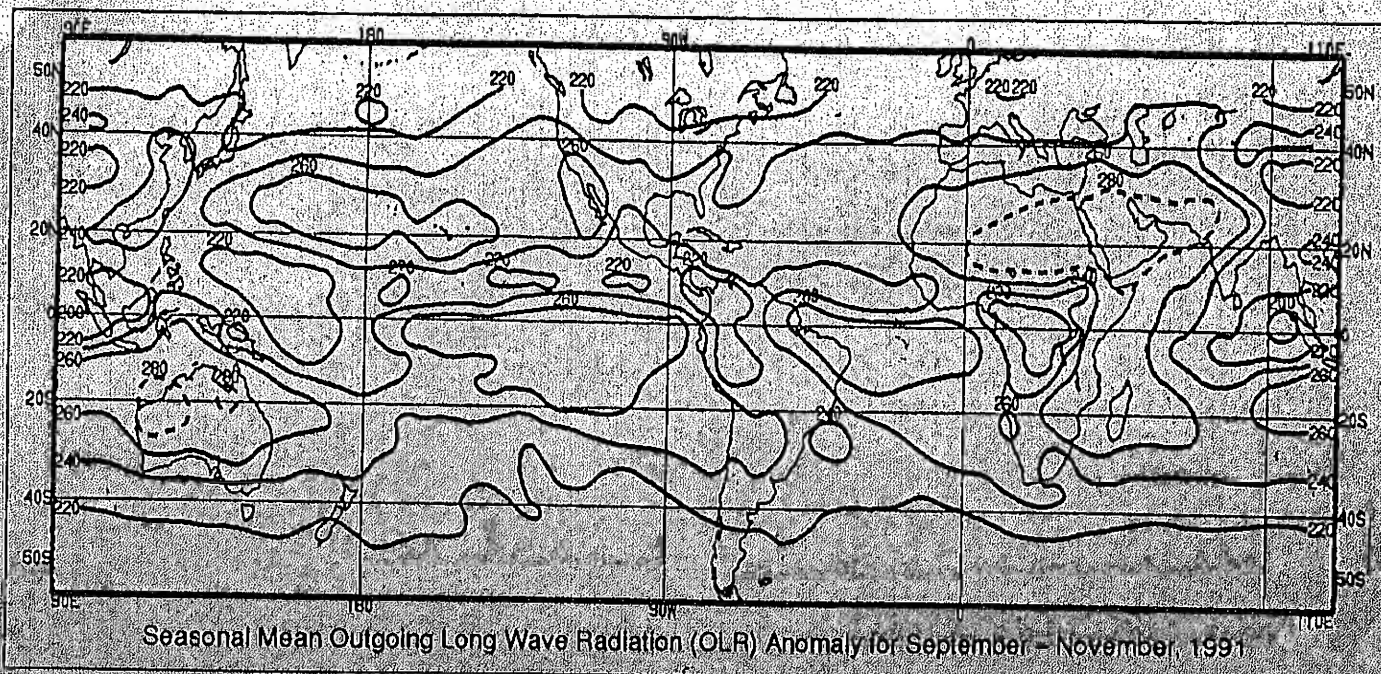


The anomalies on this chart are based on approximately 2500 observing stations for which at least 350 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the twelve month period is less than 100 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total twelve month precipitation exceeds 250 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of twelve month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



EXPLANATION

The mean seasonal outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (Wm^{-2}). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2} , and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N - 20°S) that receive primarily convective rainfall, a mean OLR value of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 - 1988 base period mean. Contour intervals are 15 Wm^{-2} , while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.

